SECTION 9 CONTENTS

Tables

WATER PLANNING AND DEVELOPMENT

In addition to being the state's political center and most densely populated county, the Jordan River Basin continues to be one of the fastest growing areas of the state. Consequently, the area's water resources are among the most extensively investigated.

9.1 Introduction

This section describes existing and potential alternatives for meeting the future water needs in the Jordan River Basin. Present water uses and supplies are discussed along with future water needs, alternatives for meeting needs, environmental, financial and economic considerations, water quality assessment and cost estimates. Many water-related planning and development studies have been completed, not only by the Division of Water Resources, but by numerous public agencies and private entities.

9.2 Background

Water development was an essential element of early settlements. The availability of water resources was critical as the pioneers realized successful settlement would occur only where water resources were available. Early Mormon church leaders stressed community development over individual ownership, especially with regards to natural resources. The early pioneer's approach was to develop cooperative water distribution systems. Those early ideals laid the foundation for many of the principles embodied in today's Utah water law, and the methods now employed to administer and manage the state's water resources. Community rights led to a standard of "beneficial use" as the basis for the establishment of an individual water right. The overriding principle of Utah's water law is that all water belongs to citizens of the state, and water planing and development through the years have been founded upon this principle.

9.2.1 Past Water Planning and Development

Water development in Salt Lake Valley began with the first settlements of pioneers in the late 1840s. Over the course of the next two decades, each of the valley's mountain streams was developed for irrigation use. During the same period of time, wells were dug to provide culinary water for the settlements. As early as 1864, Salt Lake City began searching for additional culinary water supplies. The search ultimately lead to the first "exchange agreement" in 1888. This agreement resulted in Jordan River water being applied to irrigated fields in exchange for higher quality Emigration Creek and Parley's Creek water which was made available for culinary use. Since that precedent, other exchanges have been enacted converting much of the valley's high quality water to culinary use while poorer quality water has been used for irrigation.

West Ridge Golf Course

Since 1947 a few reservoirs have been constructed on the mountain streams and in the Jordan River Basin to facilitate the development of water resources. See Table 6-1 for a listing of existing reservoirs. Other past water development projects included the construction of canals, canal lining, culinary water systems, culinary water storage tanks and ponds, and waste water treatment facilities.

Over the years the Board of Water Resources has provided technical assistance and funding for 36 projects in the Jordan River Basin totaling nearly $20 million. These projects are listed in Table 9-1. Table 8-1 shows a breakdown of the loaned amounts by fund.

9.2.2 Current Water Planning and Development

Most of the present water planning carried out by the state is through the Division of Water Resources. The division recently completed the Wasatch Front Water Demand/Supply Model (WFCM). To date, it is the most thorough investigation of the existing and future water supplies in the Jordan River Basin. The objective of the model was to improve the accuracy and geographic resolution of water demand projections for the rapidly growing four urban counties which are part of the Wasatch Front (Salt Lake, Davis, Weber, and Utah counties). The key objective of the effort was to make accurate water demand projections and match existing and future supplies with needs over time. The WFCM is used to make forecasts for specific geographic areas and water use sectors, and has the flexibility to analyze a range of possible future patterns. The model is interactive and is designed specifically to aid water agency managers to effectively forecast future needs, design water system facility improvements, and evaluate the impacts of drought and other conditions on the water systems. The WFCM was not only used to forecast future water use; it was the basis for the present water use data shown in Section 5 and Table 9-2. The present water use data generated by the WFCM are for the year 1995. Present water use and supply data and future water needs shown in this section were taken from the model.

The water supply shown in Table 9-2, consists of public water supplies which makes up the bulk of the municipal and industrial (M&I) water throughout the valley. It includes all water made available through the public water supply systems. These public water supplies are used for residential, commercial/ institutional and industrial uses.

The public water supply comes from nine sources: City Creek, Parley's Creek, Big Cottonwood Creek, Little Cottonwood Creek, other small mountain streams, Welby-Jacob Exchange, Central Utah Project, Deer Creek Reservoir, and groundwater. Table 9-2 shows the average annual supply and the reliable supply for nine out of 10 years. For planning purposes, the reliable supply for nine out of 10 years is often considered as the firm yield.

9.2.3 Environmental Considerations

Too often in the past, water has been viewed as a commodity for human use and consumption with little thought to the impact its development will have upon the environment. In today's world, instream flows and water quality issues are as essential to good planning and development as any other issue, and should be considered early and often in the planning process. Although no instream flow requirements have been established within the Jordan River Basin, several private and public bird refuges along the shores of the Great Salt Lake have established water rights. Currently these water rights insure that water flows continually in the Jordan River and many of its tributaries.

9.3 Water Resource Problems

The water resources problems include water quality, meeting future M&I needs, groundwater mining, groundwater contamination, maintaining the existing infrastructure and flooding. The trend of converting agricultural land to residential areas has freed up irrigation water for other uses. It is likely this trend will continue. Unfortunately, the irrigation water being made available is Utah Lake and Jordan River water which is of poor quality and very expensive to treat for M&I use.

The groundwater problems include concerns for groundwater quality and quantity. Both of these issues are addressed by the State Engineer through the *Salt Lake County Groundwater Management Plan.* In particular, the state has imposed restrictions upon new well permits. This action is aimed at protecting the principal aquifer from over-development and contamination. Refer to Section 19 for more information.

Table 9-1
BOARD OF WATER RESOURCES DEVELOPMENT PROJECTS

Sponsor	Type	Year
Alta Town	Cl-Tank	1977
Bell Canyon Irrigation Company	Pr-Pipe	1953
Bell Canyon Irrigation Company	Dual-Ws	1954
Bell Canyon Irrigation Company	Dual-Ws	1957
Bell Canyon Irrigation Company	Misc	1953
Bell Canyon/N Dry Creek Irr Companies	Dam-Enl	1948
Bell Canyon/N Dry Creek Irr Companies	Dam-Enl	1959
Bluffdale City	Cl-Pipe	1979
Brighton & North Point Irrigation Companies	Div-Dam	1986
Castro Springs Irrigation Company	Dual-Ws	1954
Central Utah Water Conservancy District	Cl-Trmt	1973
Central Utah Water Conservancy District	Cl-Tank	1994
Draper Irrigation Company	Div- Dam	1988
Draper Irrigation Company	Dual-Ws	1993
Granite Water Company	Cl-Pipe	1949
Herriman Irrigation Company	Pr-Pipe	1953
Herriman Irrigation Company	Pr-Pipe	1970
Herriman Pipeline & Dev Company	Cl-Tank	1987
Herriman Pipeline & Dev Company	Cl-Well	1993
Lark Water Users	Cl-Syst	1967
Mount Air Water Corp	Cl-Syst	1985
North Dry Creek Irrigation Company	Cl-Tank	1959
North Jordan Irrigation Company	Div-Dam	1986
Provo Reservoir Water Users Company	Cnl-Lng	1956
Richards Irrigation Company	Dual-Ws	1986
Riverton City	Cl-Pipe	1989
Rose Creek Irrigation Company	Pr-Pipe	1962
Salt Lake City Corporation	Cl-Tank	1982
Salt Lake City Metropolitan Water District	Dam	1986
Salt Lake County Water Conservancy District	Cl-Pipe	1993
Sandy Canal Company	Lh-Pipe	1994
South Despain Ditch Company	Dam-Res	1949
South Despain Ditch Company	Dam-Enl	1963
South Despain Ditch Company	Dual-Ws	1978
South Despain Ditch Company	Dam-Rep	1984
Spring Glen Water Company	Cl-Tank	1991
Total Salt Lake County Projects	36	

9.4 Water Use and Projected Demands

The Wasatch Front Water Demand/Supply Computer Model (WFCM) was used to predict the future water needs of Salt Lake County. Based on existing use patterns and the population growth projections provided by the Governor's Office of Planning and Budget (See Section 4), WFCM was used to project future water use needs at five-year intervals from years 2000 through 2020.

Table 9-2
CURRENT AND PROJECTED PUBLIC WATER SUPPLY BY SOURCE
Jordan River Basin

SOURCE	Currently Developed (1995)		Projected Development (2020)	
	Average	Reliable[a]	Average	Reliable[a]
	(acre-feet)			
City Creek	8,310	6,080	8,310	6,080
Parley's Creek	8,890	5,210	12,310	8,630
Big Cottonwood Creek	25,920	20,020	30,300	22,340
Little Cottonwood Creek	21,670	17,340	37,500	23,700
Small Mountain Streams	3,400	1,100	3,400	1,100
Welby-Jacob Exchange	29,400	17,500	21,500[b]	9,600[b]
Central Utah Project	70,000	84,000[c]	70,000	84,000[c]
Deer Creek Reservoir	61,700	61,700	61,700	61,700
Groundwater	114,400	114,400	125,410	125,410
Groundwater Recharge	5,800	1,060	5,800	1,060
TOTAL	349,490	328,410	376,230	343,620

a: Reliable nine out of 10 years
b: Excludes 7,900 acre-feet of yield that may be dedicated to the CUP Bonneville Unit water supply.
c: The Central Utah Project is managed to bring 84,000 acre-feet into the basin during times of drought.

A number of assumptions were made in the creation of the Wasatch Front Water Demand/Supply Model. They are:

- All existing developed water supplies will continue to be available for use in Salt Lake County.
- Municipal & industrial water supplies will be shared by all users in Salt Lake County.
- The Central Utah Project will be completed and deliver 50,000 acre-feet to the Salt Lake County Water Conservancy District and 20,000 acre-feet to the Metropolitan Water District of Salt Lake City.
- An additional 10,000 acre-feet of groundwater will be developed by the Salt Lake County Water Conservancy District. This will bring the groundwater development close to its safe yield for the valley (See Section 19, Groundwater). Also assumes 5,400 acre-feet will be developed by artificial groundwater recharge
- For all surface streams in Salt Lake County, it is assumed that up to 90 percent of the flow will be diverted as needed.
- City Creek, Parley's Creek, Little Cottonwood and Big Cottonwood water treatment plants will be enlarged.
- Little Dell Reservoir water will be treated and used at the expanded Parley's Creek water treatment plant.
- Water conservation measures were not included in the initial running of the model and the projecting of future water needs. This created a base line from which the impacts of the various conservation measures could best be evaluated. The model was then run including the various conservation measures. The projected effects of water conservation are expected to reduce the projected water use by about 11.4 percent (47,700 acre-feet) by the year 2020. Water conservation is discussed in Section 17.

Table 9-3
PROJECTED CULINARY M&I DEMAND AND SUPPLY FOR MAJOR WATER SUPPLIERS
Jordan River Basin

Year	Population Projection	Water Demand (acre-feet)	Water Supply (acre-feet)	Surplus Deficit ()
1995	805,000	255,700	348,360	92,660
2000	871,400	279,600	348,360	68,760
2005	958,000	308,500	348,360	39,860
2010	1,078,200	345,600	348,360	2,760
2015	1,199,800	384,100	348,360	(35,740)
2020	1,300,100	419,300	348,360	(70,940)

Source: Wasatch Front Demand/Supply Computer Model (February 1997)

Table 9-4
CURRENT USES AND PROJECTED WATER DEMANDS

Use Category	1995	2020
Municipal & Industrial:		
Culinary		
Residential	164,600	261,500
Commercial/Institutional	77,200	135,000
Industrial	15,400	25,300
Private Domestic	24,600	20,000
Self-Supplied Industrial	26,500	26,500
(sub-subtotal)	308,300	468,300
Secondary		
Municipal	10,000	15,000
Industrial	13,200	13,200
(sub-subtotal)	23,200	28,200
Total	331,500	496,500
Irrigated Agricultural	126,500	50,000
Developed Wetlands and Waterfowl Areas	94,500	94,500
Basin Total	552,500	641,000

Table 9-5
JORDAN RIVER BASIN TOTAL WATER DIVERSIONS AND DEPLETIONS

Use Category	1995		2020		2050	
	Diversions	Depletions	Diversions	Depletions	Diversions	Depletions
Municipal and Industrial						
Culinary	308,300	130.950	468,300	216,290	738,000	369,000
Secondary	23,200	14,900	28,200	17,690	35,000	21,000
Subtotal	331,500	145,850	496,500	233,980	773,000	390,000
Irrigated Agriculture	126,500	50,600	50,000	20,000	5,000	2,000
Wet/Open Water Areas	94,500	94,500	94,500	94,500	94,500	94,500
Basin Total	552,500	290,950	641,000	348,480	872,500	486,500

The model predicts that over the next 25 years the demand for public water will increase an average of 2.0 percent per year. The 1995 demand for major public water suppliers of 255,700 acre-feet per year will increase nearly 65 percent by the year 2020 to an annual demand of 419,300 acre-feet. Table 9-3 compares the projected water demand with the existing water supplies. As can be seen from the table, if the model's projected pattern is correct, Salt Lake County will begin experiencing public water supply shortages after the year 2010. These culinary M&I water projections do not include the effects of water conservation measures. The projected effects of water conservation are expected to reduce the projected water use by about 11.4 percent (47,700 acre-feet) by the year 2020. With conservation measures Salt Lake County will not begin experiencing shortages until after 2016. Table 9-4 summarizes 1995 and projected demands for various use categories. Since water sources are fully developed or at the very least fully appropriated, and the basin is closed to further water rights appropriations, it is assumed there will be virtually no new privately developed water supplies. It may turn out, however, that as agricultural lands continue to be converted to residential property, some of the privately developed agricultural water supplies will be converted to public water supplies. However, the potential for converting agricultural water to culinary water will be limited by water quality concerns with Utah Lake and Jordan River water and the high cost of treatment to M&I standards. Table 9-5 summarizes the total water diversions and depletions for the years 1995, 2020 and 2050.

9.5 Alternatives for Meeting Water Needs

Planning for Jordan River Basin's future water needs has become a complex issue. In the past, water planning primarily meant developing new water sources. In the future, there are a number of potential water sources that can be developed to meet the projected water needs. However, they are all expensive.

Ultimately, the citizens may be willing to absorb the cost of developing the new and expensive water sources rather than affecting a change in life-style. It is incumbent upon today's water planners to consider the supply-side approach and the demand-side approach to water planning. Although this section is devoted primarily to the discussion of supply-side alternatives (i.e. developing new water sources), effective demand-side water planning such as water conservation, reuse, reduced system losses, and improved efficiencies, can reduce the need for additional supplies. A brief discussion of water conservation alternatives is included in this section, but a more thorough discussion is included in Section 17, Water Conservation/Education.

Alternatives for meeting future water needs can be classified in six basic groups:

- Develop Utah Lake/Jordan River water,
- Develop additional water from the Wasatch Range streams,
- Develop additional groundwater,
- Groundwater recharge
- Bear River Water development,
- Conservation

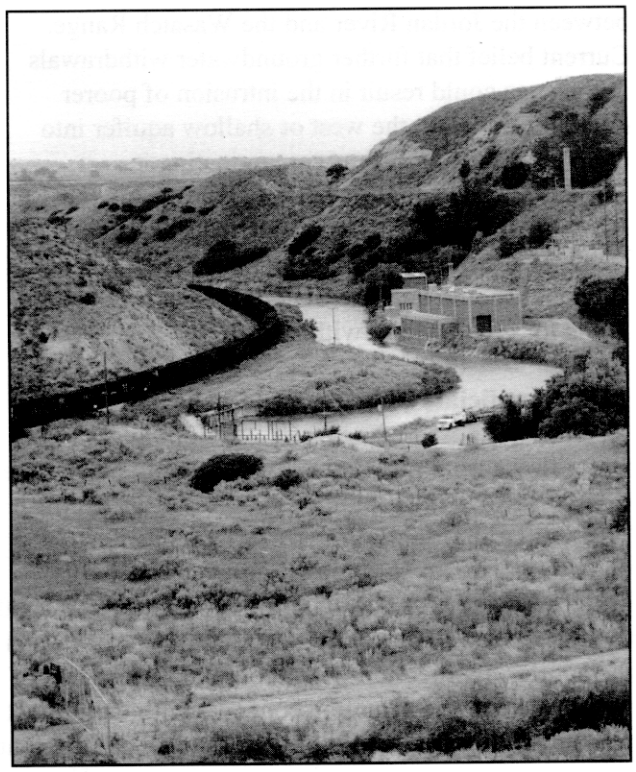
Given today's political and environmental climate, some of the alternatives listed above have more merit than others. Based upon current growth projections, meeting the future water demand will require some combination of the alternatives listed above. Possibly, each alternative may at one time or another play a part in the future. A discussion of each alternative along with its relative merits is included in the subsections that follow.

9.5.1 Develop Utah Lake/Jordan River Water

At the present time, a significant supply of water tributary to Utah Lake flows in the Jordan River. This supply source should continue to increase with time as more agricultural lands are converted to residential and commercial uses. Unfortunately, Jordan River water is of poor quality, and it will prove costly to treat it to M&I standards. Total dissolved solids (TDS) levels in Utah Lake are already so high that conventional treatment of Jordan River water is not economically feasible. As the Jordan River flows northward toward the Great Salt Lake, TDS levels are further increased along with other pollution parameters, including coliform bacteria, inorganics and heavy metals. These problems make the use of the Jordan River for M&I purposes very expensive. Despite these problems, in 1995 the Salt Lake County Water Conservancy District experimented with treating Jordan River water and blending it with high quality water to stretch existing water supplies. Many odor and taste

problems were reported by consumers, and at the present time this approach to developing Jordan River water has been discontinued.

There are, however, other methods by which Jordan River water could be developed. Secondary water systems could deliver Jordan River water for commercial and industrial and other non-culinary uses such as watering large grass areas, (i.e. parks and golf courses). This approach could reduce the amount of treatment required to meet culinary water needs and is being used to some extent by several cities. The capital expense of building an infrastructure to deliver secondary water would be considerable, and should be weighed against the cost of other alternatives.



Jordan Narrows Pumping Station

Another approach would be to use more advanced water treatment methods to treat Jordan River. Current state of the art treatment methods could be employed to render Jordan River water drinkable. These methods, however, are expensive (400-500 dollars per acre-foot) and could result in a significant cost increase to the water users.

Still another approach for the development of Jordan River water would be to buy Jordan River water rights, then leave the water in Utah Lake and transfer the water right to groundwater withdrawals in Utah County. While this approach is hydrologically sound and would probably meet with approval from the State Engineer, it would likely meet with stiff opposition from water user's in Utah County.

9.5.2 Develop Additional Water from Wasatch Range Streams

The development of additional water from the Wasatch Range streams holds a limited potential for addressing the future needs. Plans in place to enlarge some of the water treatment facilities and put more of this high quality water to culinary use. Further development of these streams, however, is a very sensitive environmental issue.

A significant quantity of high quality water flows from the mountain streams to the Jordan River and subsequently to the Great Salt Lake. The average annual flow into the Salt Lake Valley from Wasatch Range streams is 173,400 acre-feet. At the present time, approximately 68,000 acre-feet of that water is incorporated into public water supplies. Existing plans to enlarge and improve the management of existing water treatment facilities would increase this amount to 91,640 acre-feet. That still leaves a significant quantity of high quality water that could be developed from the Wasatch Range streams. It is estimated about 75 percent of the flow from these streams (about 130,000 acre-feet) comes during the spring runoff period from mid-April through mid-July. To fully develop this high quality water for culinary use, it will be necessary to either construct reservoir storage or provide treatment plant capacity equivalent to the peak runoff.

The feasibility of reservoir construction on Wasatch Range streams and within the Salt Lake Valley has been investigated. *The Salt Lake County Area-Wide Water Study* conducted jointly by the Metropolitan Water District of Salt Lake City, the Salt Lake City Corporation, the Salt Lake County Water Conservancy District and the Division of Water Resources in 1982, identified several potential reservoir sites in the Wasatch Range canyons as well as various locations within Salt Lake Valley. At the present time, however, it is widely held that for political, economical and environmental reasons, the construction of additional reservoirs within the Jordan River Basin is not a viable option.

Without additional surface reservoir storage, the

only way to increase culinary water use of Wasatch Range streams would be to provide treatment plant capacity equal to the peak runoff during periods of time when runoff flow rates can be absorbed by municipal water demands. The peak monthly runoff from all of the Wasatch Range streams is about 40,000 acre-feet. This translates to 435 million gallons per day (mgd). At the present time, the capacity of treatment plants on the east side of the valley is 233 mgd. These east-side treatment plants (City Creek, Parley's, Big Cottonwood, Metropolitan, Southeast Regional and Draper) are currently being used to treat the mountain stream runoff. In addition to these facilities, there is the Jordan Valley treatment plant located in Bluffdale. This facility currently has the capacity to treat 180 mgd with the potential to enlarge to 255 mgd in the future. The total current treatment capacity for the basin is 413 mgd with the potential to enlarge to 540 mgd (see Table 9-6). The valley's water treatment plants have sufficient capacity to treat and use more of the outflow from the Wasatch Range streams. But a tremendous cost would be incurred to convey the short duration flows across the valley to the Jordan Valley treatment plant. Furthermore, since the Wasatch Range's peak runoff occurs in May, it does not match up with the valley's peak demand which takes place in July and August. Consequently, substantial storage would still be necessary to effectively develop additional water from the Wasatch Range streams.

Table 9-6
WATER TREATMENT FACILITIES
Jordan River Basin

Treatment Plant	Current Capacity (mgd)	Planned Enlargement (mgd)
City Creek	15	-
Parley's	40	5
Big Cottonwood	40	-
Metropolitan	113	37
Southeast Regional	20	10
Draper Irrigation Co.	5	-
Jordan Valley	180	75
Total Capacity	413	127

9.5.3 Develop Additional Groundwater

It is generally believed the Salt Lake Valley groundwater basin is fully appropriated. (For more information on groundwater, See Section 19.)

Plans to develop additional groundwater sources in the Salt Lake Valley are being considered, but this will be done on a very limited basis and monitored closely by the Division of Water Rights. At the present time, the State Engineer as well as many other groundwater experts believe the current level of groundwater withdrawals is approaching the safe yield levels for the valley. Groundwater recharge data show significantly more water in the groundwater basin than is currently being withdrawn. The concern, however, is that much of the groundwater recharge is of poor quality. The high quality groundwater area designated in the state's *Interim Groundwater Management Plan* as "Management Area Number 1" (See Figure 19-3) is located on the east side of the valley, primarily between the Jordan River and the Wasatch Range. Current belief that further groundwater withdrawals in this area could result in the intrusion of poorer quality water from the west or shallow aquifer into the principal aquifer, thus contaminating it.

The U.S. Geological Survey, jointly with the Division of Water Rights, conducted a groundwater study for the Salt Lake Valley that was published in 1996 and should help the State Engineer set the final limits for groundwater withdrawals.

9.5.4 Artificial Groundwater Recharge

Another possible means of developing surface water flows from mountain streams would be to store excess flows in the groundwater aquifer for later use. The Salt Lake County Water Conservancy District undertook a demonstration groundwater recharge project in southeast Salt Lake County during the 1990 to 1994 period. The demonstration project recharged the aquifer by injection with about 2,650 acre-feet of water. One of the principle concerns with the project was protecting the quality of the principal aquifer that serves as a major source of municipal water. The approach taken is to treat the injectate to drinking water standards and conduct extensive water quality monitoring. The project was set up to determine how much of the injected water can be recovered.

Based on the success of the demonstration project, the Salt Lake County Water Conservancy District submitted a groundwater recharge proposal for funding under the Central Utah Project Completion Act. The proposal has been funded and construction is underway. When completed, the project will produce an average of 5,800 acre-feet of

water per year. The project will treat spring runoff water from the canyons in the southeast portion of Salt Lake County and inject the treated water into the aquifer. The water will be pumped from wells later in the year as needed to meet demand.

9.5.5 Bear River Development

The Bear River has long been viewed as an available water resource. An average annual flow of over a million acre-feet flows from the river to the Great Salt Lake. However, based on the river's flow pattern (water is available only during the winter and spring months) and poor water quality, it has remained an untapped resource. The Salt Lake County Water Conservancy District submitted an application in 1986 to the Board of Water Resources for assistance in developing 50,000 acre-feet of water from the Bear River.

During the flooding of the early 1980s, the Division of Water Resources was directed by the legislature to investigate Bear River water storage options that would help control the level of the Great Salt Lake. A joint legislative/gubernatorial Bear River task force was created in 1990 to look at water development options on the Bear River. This Bear River Task Force apportioned the state's Bear River water rights to Cache and Box Elder counties, Weber Basin Water Conservancy District and Salt Lake County Water Conservancy District. The task force provided that each county would get 60,000 acre-feet of water and each district would get 50,000 acre-feet of water.

The division was directed by the task force to prepare a plan for delivering the apportioned water rights. The *Bear River Pre-Design Report* was published in 1991. It identified a plan for development that had four major parts: First, development of a water storage reservoir in the upper basin to provide replacement for groundwater withdrawals; second, a diversion from the Bear River to move water via canal or pipeline to Willard Bay Reservoir; third, the construction of transmission facilities to move project water from Willard Bay south to Davis, Weber, and Salt Lake counties; and fourth, the construction of a reservoir on the lower Bear River. The current plan has been modified to constructing a pipeline or canal from the Bear River to Willard Bay Reservoir, a water treatment facility in Weber County, and the necessary conveyance facilities to get treated water to its point of use. The projected cost of that project is approximately $300 million.

The Bear River Task Force introduced legislation that further defines the state's role in the development of the river. The 1991 Bear River Development Act states the Division of Water Resources shall construct a state project that may include the construction of reservoirs on the Bear River and a pipeline or canal to Willard Bay Reservoir. All facilities constructed to deliver water to potential users from those facilities will be the responsibility of the water purchaser.

The Salt Lake County Water Conservancy District (SLCWCD), in cooperation with the Weber Basin Water Conservancy District (WBWCD), is proposing the construction of a water treatment plant in central Weber County. The SLCWCD is currently purchasing land for the plant. Also, in cooperation with the WBWCD, the SLCWCD is investigating pipeline alignment alternatives to convey Bear River water from the proposed plant south to Salt Lake County and the east shore area of Davis and Weber counties This pipeline will deliver needed water to SLCWCD as well as alleviate an infrastructure problem for WBWCD in the east shore area of Davis and Weber counties. These proposed facilities would provide the infrastructure to move water south from the Bear River to Salt Lake County and also the opportunity for various Weber Basin water suppliers to lease water to the SLCWCD.

9.5.6 Conservation

Stretching existing water supplies through a number of conservation practices has potential. Water users may be able to better manage their supplies thereby increasing efficiencies which in turn can reduce costs. This applies to all water uses including residential, commercial, industrial and agricultural.

Water reuse is also a potential water conservation practice that might be employed in the near future. One approach to water reuse currently being investigated is the delivery of wastewater effluent from the Central Valley Wastewater Treatment Plant to irrigation canals where it would be co-mingled with irrigation water before being applied to irrigated fields. This approach to water reuse and other conservation efforts are discussed in more detail in Section 17, Water Conservation/ Education. Water conservation will undoubtedly play an important role in addressing future water needs. It is not likely,

however, that water conservation will entirely replace the need to develop additional water supplies.

9.6 Issues and Recommendations

9.6.1 Local Planning

Issue - Not all communities are taking a long-range approach to water planning.

Discussion - With new water sources becoming limited in the never-ending search for additional water supply, water purveyors need to plan for their future growth. Water conservation sooner or later will need to be an integral part of the water agency's management plan. The present advice from water planners throughout the United States is to estimate the community's growth and plan a combination of water supply and water conservation strategies that will help provide an orderly structural and non-structural program to meet the community needs.

Various scenarios should be employed considering all the options available to the communities. Least-cost strategy should be used, with water conservation and environmental impacts given full consideration. Obviously, new reservoir and groundwater sources would be used, along with conversion of agricultural water and reduction of water demand through better efficiencies within and outside the home.

The plan should be revised as needed with a formal acceptance by the community council or water agency board. By updating the population projections, revising the future water sources and reducing the demand through conservation methods, the members of the board responsible for water delivery will be alerted to future problems that may be beyond their term of office, but require immediate action for the future quality of life of the community.

Recommendation - All communities and/or water utilities should prepare a long-term water management plan which includes proposed new water supply sources and water conservation programs. The plans should be revised and updated as needed.

9.6.2 Cooperative Inter-agency Planning

Issue - The Jordan River Basin's growth coupled with its multitude of governmental agencies present a complex planning picture.

Discussion - Many federal, state and local agencies are involved in water planning within the Jordan River Basin. All of these agencies have a vested interests in the development and the use of Jordan River water. But agencies' planning goals and strategies are often similar, or sometimes agencies have conflicting interests or goals. Therefore, interagency cooperation and coordination is needed to complete effective planning of the water resources.

Recommendation - Various federal, state and local agencies should take an active role in the development of the *Jordan River Basin Management Plan* to insure it addresses their water management goals. ■

West Jordan City Hall